AMENDMENTS TO THE CLAIMS

1-117. (Canceled)

118. (**Currently Amended**) A method for ~~analyzing~~ processing data from a glucose sensor, comprising:

monitoring a data stream from ~~the~~ a glucose sensor;

detecting transient non-glucose related signal artifacts ~~in the data stream that have a higher amplitude than a system noise, including~~, wherein the step of detecting transient non-glucose related signal artifacts comprises evaluating a severity of ~~the~~ signal artifacts; and

replacing at least some of the signal artifacts ~~using~~ with one or more estimated glucose ~~signal~~ values.

119. (Previously Presented) The method of claim 118, wherein the severity evaluation is based on an amplitude of the transient non-glucose related signal artifacts.

120. (Previously Presented) The method of claim 118, wherein the severity evaluation is based on a duration of the transient non-glucose related signal artifacts.

121. (Previously Presented) The method of claim 118, wherein the severity evaluation is based on a rate-of-change of the transient non-glucose related signal artifacts.

122. (Previously Presented) The method of claim 118, wherein the severity evaluation is based on a frequency content of the transient non-glucose related signal artifacts.

123. (Previously Presented) The method of claim 118, wherein the artifacts replacement step comprises selectively applying one of a plurality of signal estimation algorithm factors in response to the severity of the signal artifacts.

124. (Previously Presented) The method of claim 123, wherein the plurality of signal estimation algorithm factors comprise a single algorithm with a plurality of parameters that are selectively applied to the algorithm.

125. (Previously Presented) The method of claim 123, wherein the plurality of signal estimation algorithm factors comprise a plurality of distinct algorithms.

126. (Previously Presented) The method of claim 123, wherein the step of selectively applying one of a plurality of signal estimation algorithm factors comprises

selectively applying a predetermined algorithm that comprises a set of parameters whose values depend on the severity of the signal artifacts.

127-147. (Canceled)

148. (**New**) The method of claim 118, wherein the step of replacing signal artifacts with one or more estimated glucose values comprises outputting data representative of the one or more estimated glucose values, including at least one of a numeric representation of the one or more estimated glucose values, an indication of directional trend of the one or more estimated glucose values, and a graphical representation of the one or more estimated glucose values.

149. (**New**) The method of claim 148, further comprising filtering the data stream, wherein the one or more estimated glucose values are based on the filtered data stream when the step of evaluating a severity of signal artifacts detects signal artifacts that meet one or more predetermined criteria.

150. (**New**) The method of claim 149, wherein the one or more estimated glucose values are based on the unfiltered data stream when the step of evaluating a severity of signal artifacts detects signal artifacts that do not meet one or more predetermined criteria.

151. (**New**) The method of claim 118, wherein the data stream monitoring step comprises receiving data from one of a non-invasive, a minimally invasive, and an invasive glucose sensor.

152. (**New**) The method of claim 118, wherein the data stream monitoring step comprises receiving data from one of an enzymatic, a chemical, a physical, an electrochemical, a spectrophotometric, a polarimetric, a calorimetric, an iontophoretic, and a radiometric glucose sensor.

153. (**New**) The method of claim 118, wherein the signal artifacts detection step comprises at least one of: testing for ischemia within or proximal to the glucose sensor; monitoring a level of pH proximal to the sensor; monitoring a temperature proximal to the sensor; comparing a level of pH proximal to and distal to the sensor; comparing a temperature proximal to and distal to the sensor; monitoring a pressure or stress within the glucose sensor; evaluating historical data for high amplitude noise above a predetermined threshold; a Cone of Possibility Detection Method; evaluating the data stream for a non-physiological rate-of-change;

monitoring the frequency content of the signal; performing an orthogonal basis function-based transform; performing a Fourier Transform; and performing a wavelet transform.

154. (**New**) The method of claim 118, wherein the artifacts replacement step comprises at least one of: performing linear or non-linear regression; performing a trimmed mean; filtering using a non-recursive filter; filtering using a finite impulse response filter; filtering using a recursive filter; filtering using an infinite impulse response filter; performing a maximum average algorithm; and performing a Cone of Possibility Replacement Method.

155. (**New**) The method of claim 118, wherein the signal artifacts replacement step is substantially continual.

156. (**New**) The method of claim 118, wherein the signal artifacts replacement step is initiated when the step of evaluating a severity of signal artifacts detects signal artifacts that meet one or more predetermined criteria.

157. (**New**) The method of claim 118, wherein the signal artifacts replacement step is terminated when the step of evaluating a severity of signal artifacts detects signal artifacts that do not meet one or more predetermined criteria.

158. (**New**) The method of claim 118, further comprising discarding at least some of the signal artifacts.

159. (**New**) The method of claim 118, further comprising calibrating the data stream.

160. (**New**) The method of claim 159, wherein the step of detecting transient non-glucose related signal artifacts in the data stream is performed on the calibrated data stream.

161. (**New**) The method of claim 159, wherein the signal artifacts replacement step comprises measuring at least one of rate-of-change, acceleration, and physiologically feasibility of one or more calibrated glucose values.